

WHAT IS CLAIMED IS:

1 1. Apparatus for ascertaining the transverse
2 dimensions of at least one at least substantially rod-
3 shaped article while the article is maintained in a prede-
4 termined position, comprising at least one measuring ar-
5 rangement which includes:

6 at least one radiation source arranged to direct
7 a variable-orientation beam of radiation against the at
8 least one article occupying said predetermined position
9 whereby the article intercepts a portion of the beam
10 which is indicative of a transverse dimension of the
11 article;

12 a device for generating on the basis of the thus
13 influenced beam of radiation signals denoting the
14 transverse dimensions of the at least one article in
15 plural orientations of the at least one article and the
16 beam relative to each other; and

17 means for selectively altering the orientation
18 of the beam and the at least one article relative to each
19 other.

1 2. The apparatus of claim 1, wherein the at
2 least one article forms part of or constitutes a smokers'
3 product.

1 3. The apparatus of claim 1, wherein said at
2 least one measuring arrangement comprises at least one
3 optical element.

1 4. The apparatus of claim 1, wherein said at
2 least one radiation source is arranged to direct short-
3 lasting beams of radiation against the at least one
4 article occupying said predetermined position.

1 5. The apparatus of claim 1, further comprising
2 means for maintaining the at least one article at a
3 standstill during exposure to the beam of radiation.

1 6. The apparatus of claim 1, further comprising
2 means for moving the at least one article during exposure
3 to the beam of radiation.

1 7. The apparatus of claim 1, wherein said alter-
2 ing means includes means for moving one of the at least
3 one article and the beam relative to the other thereof.

1 8. The apparatus of claim 1, wherein said radia-
2 tion source is arranged to direct a beam at least sub-
3 stantially at right angles to a longitudinal axis of the
4 article in said predetermined position.

1 9. The apparatus of claim 1, wherein said alter-
2 ing means includes means for turning the beam about an
3 axis which is at least substantially parallel to a longi-
4 tudinal axis of the article in said predetermined posi-
5 tion.

1 10. The apparatus of claim 1, wherein said alter-
2 ing means includes means for turning the beam about an
3 axis which coincides with a longitudinal axis of the ar-
4 ticle in said predetermined position.

1 11. The apparatus of claim 1, further comprising
2 means for evaluating said signals and for generating
3 output signals denoting averaged transverse dimensions
4 of the article.

1 12. The apparatus of claim 1, wherein said ori-
2 entation altering means comprises means for moving the
3 beam relative to the at least one article.

1 13. The apparatus of claim 12, wherein said
2 moving means is arranged to move the beam relative to
3 a point within the at least one article in said predeter-
4 mined position.

1 14. The apparatus of claim 1, comprising a plu-
2 rality of measuring arrangements for simultaneously as-
3 certaining the transverse dimensions of a plurality of
4 rod-shaped articles each of which is maintained in a pre-
5 determined position relative to the respective measuring
6 arrangement, said measuring arrangements being adjacent
7 each other and said altering means of each of said mea-
8 suring arrangements including means for synchronously
9 altering the orientation of beams generated by the
10 radiation sources of said plurality of measuring arrange-
11 ments.

1 15. The apparatus of claim 14, wherein the
2 number of said measuring arrangements is two.

1 16. The apparatus of claim 14, wherein said
2 means for synchronously altering the orientation of said
3 beams includes mobile components of said measuring arran-
4 gements and means for moving said mobile components in
5 synchronism with each other relative to points located
6 within the confines of articles assuming said predeter-
7 mined positions relative to the respective measuring ar-
8 rangements.

1 17. The apparatus of claim 16, wherein said
2 moving means is arranged to move said mobile components
3 relative to points located within the confines of the
4 respective articles.

1 18. The apparatus of claim 17 for ascertaining
2 the transverse dimensions of rod-shaped articles having
3 longitudinal axes, wherein said points are located at
4 least close to the axes of the respective articles.

1 19. The apparatus of claim 17 for ascertaining
2 the transverse dimensions of rod-shaped articles having
3 longitudinal axes, wherein said points are located in
4 planes which are inclined relative to the axes of the
5 respective articles.

1 20. The apparatus of claim 18, wherein said
2 altering means of each of said measuring arrangements
3 includes means for altering the orientation of said beams
4 through angles of at least close to 180°.

1 21. The apparatus of claim 14, wherein the
2 number of said measuring arrangements is two and said
3 two measuring arrangements are adjacent each other, said
4 means for synchronously altering the orientation of said
5 beams having means for moving said beams in opposite di-
6 rections.

1 22. The apparatus of claim 21, wherein said
2 means for simultaneously altering the orientation of said
3 beams is arranged to move each of the beams between two
4 end positions in each of which said measuring
5 arrangements are disposed at least substantially opposite
6 each other.

1 23. The apparatus of claim 22, wherein each of
2 said measuring arrangements comprises a housing having
3 a longer section and a shorter section, said longer
4 section of at least one of said housings being turnable
5 away from the measuring arrangement embodying the other
6 of said housings.

1 24. A method of ascertaining the transverse di-
2 mensions of at least one rod-shaped article while the
3 article is maintained in a predetermined position, com-
4 prising the steps of:

5 directing a variable-orientation beam of radia-
6 tion against the at least one article occupying said po-
7 sition whereby the article intercepts a portion of the
8 beam which is indicative of a transverse dimension of
9 the article;

10 repeatedly altering the orientation of the beam
11 and the at least one article relative to each other;

12 evaluating the non-intercepted portion of the
13 beam in each orientation of the beam and of the at least
14 one article relative to each other; and

15 generating on the basis of evaluated radiation
16 signals denoting the respective transverse dimensions
17 of the article.

1 25. The method of claim 24, wherein the at least
2 one rod-shaped article forms part of or constitutes a
3 smokers' product.

1 26. The method of claim 24, wherein said
2 radiation is optical radiation.

1 27. The method of claim 24, wherein said
2 directing step includes directing a short-lasting beam
3 of radiation against the at least one article occupying
4 said position.

1 28. The method of claim 24, wherein said
2 altering step includes selectively changing the
3 orientation of the beam relative to the at least one ar-
4 ticle.

1 29. The method of claim 24, further comprising
2 the step of processing said signals into signals denoting
3 the average transverse dimensions of the articles.

1 30. The method of claim 24, wherein said orien-
2 tation altering step includes moving the beam relative
3 to a point within the at least one article occupying said
4 predetermined position.

1 31. The method of claim 30, wherein the beam
2 is supplied by source of radiation and said moving step
3 includes turning the radiation source relative to said
4 point.

1 32. The method of claim 31, wherein the source
2 forms part of a measuring arrangement and said moving
3 step includes turning at least a portion of the measuring
4 arrangement relative to said point, said point being
5 located in a plane which is inclined relative to a
6 longitudinal axis of the article occupying said predeter-
7 mined position.

1 33. The method of claim 30, wherein said point
2 is located in a plane which is inclined relative to a
3 longitudinal axis of the article occupying said predeter-
4 mined position.

1 34. The method of claim 30, wherein said moving
2 step includes turning the beam relative to said point
3 through an angle at least approximating 180°.

1 35. The method of claim 24, wherein said
2 directing step includes orienting the beam to impinge
3 upon the article occupying said predetermined position
4 at least substantially at right angles to a longitudinal
5 axis of the article.

1 36. The method of claim 24, wherein said
2 orientation altering step includes moving the beam
3 relative to the article about one of two axes one of
4 which is at least substantially parallel to and the other
5 of which coincides with a longitudinal axis of the article
6 occupying said predetermined position.

1 37. The method of claim 24, wherein said
2 directing step is carried out by a radiation source in
3 a housing of a measuring arrangement and said orientation
4 altering step includes moving at least a portion of the
5 measuring arrangement between a plurality of positions
6 relative to the at least one rod-shaped article occupying
7 said predetermined position.

1 38. The method of claim 37, wherein said
2 directing step includes short-lasting exposure of the
3 article to radiation in each of said plurality of posi-
4 tions of said portion of the measuring arrangement.

1 39. The method of claim 24 of simultaneously
2 ascertaining the transverse dimensions of plural rod-
3 shaped articles while the plural articles are maintained
4 in predetermined positions, wherein said directing step
5 includes directing a discrete variable-orientation beam
6 against each of the plural articles and said orientation
7 altering step includes jointly moving said discrete beams
8 relative to the respective articles.

1 40. The method of claim 39, wherein said orien-
2 tation altering step includes moving said discrete beams
3 in synchronism with each other.

1 41. The method of claim 39, wherein said orien-
2 tation changing step includes moving the beam for one
3 of said plural articles in a first direction and moving
4 the beam for another of said plural articles in a second
5 direction at least substantially counter to said first
6 direction.

1 42. The method of claim 39, wherein the plural
2 articles include first and second articles located close
3 to each other and said orientation altering step includes
4 turning the beams for the first and second articles bet-
5 ween two end positions in each of which the beam for one
6 of the first and second articles is located opposite the
7 beam for the other of the first and second articles.

1 43. The method of claim 42, wherein the beams
2 for the first and second articles are furnished by
3 discrete first and second measuring arrangements
4 having housings including shorter and longer sections,
5 the longer section of each of the housings being
6 arranged to turn away from the other measuring
7 arrangement in response to turning of the respective
8 beams to selected end positions thereof.

1 44. The apparatus of claim 19, wherein said
2 altering means of each of said measuring arrangements
3 includes means for altering the orientation of said
4 beams through angles of at least close to 180°.